PROJECT SUMMARY SHEET

PROJECT TITLE NAME: Cottonwood Creek Watershed Assessment Project

NAME, ADDRESS, PHONE AND E-MAIL OF LEAD PROJECT SPONSOR OR SUBGRANTEE:
Mellette County Conservation District
P.O. Box I
White River, South Dakota 57579-0244

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STATE CONTACT PERSON: Robert Smith, Environmental Program Scientist
PHONE: 605-773-4254**FAX:** 605-773-4068 **E-MAIL:** robert.smith@state.sd.us
STATE: South Dakota **WATERSHED:** South Dakota East of Missouri River

HYDROLOGIC UNIT CODE: 10140204 **HIGH PRIORITY WATERSHED** (yes/no): No

TMDL Development (X) and/or Implementation ( ) (check any that apply)

PROJECT TYPES: [ ] **Base** [X] **Watershed** [ ] **Groundwater** [ ] **I&E**

WATER BODY TYPES:
[ ] GROUNDWATER
[X] RIVERS
[X] STREAMS
[ ] WETLANDS
[ ] LAKES/RESERVOIRS
[ ] OTHER

NPS CATEGORY:
[X] AGRICULTURE
[ ] URBAN RUNOFF
[ ] SILVICULTURE
[ ] CONSTRUCTION
[ ] RESOURCE EXTRACTION
[ ] STOWAGE AND LAND DISPOSAL
[ ] HYDRAULIC MODIFICATION
[ ] OTHER

PROJECT LOCATION:
Mellette County in South Dakota

SUMMARIZATION OF MAJOR GOALS: The long term goal of the Cottonwood Creek Watershed Assessment Project is to locate and document sources of nonpoint source pollution in the watersheds and produce feasible restoration recommendations. Data generated by this study will provide adequate background information needed to drive watershed implementation projects to reduce sedimentation and nutrient enrichment within creek and in the watersheds. This project will result in a TMDL report for conductivity and Total Dissolved Solids (TDS) for Cottonwood Creek.

PROJECT DESCRIPTION: Cottonwood Creek is a tributary to the White River which eventually flows into Lake Francis Case, Missouri River Reservoir. The entire Cottonwood Creek watershed is within the boundaries of Mellette County and is approximately 107,478 acres. Cottonwood Creek is targeted for assessment because it is listed in the 2004 Integrated Report for conductivity and TDS.

FY 2005
PPG Carryover funds requested: $39,000 **PPG Match:** $28,890
Other Federal Funds $ 0 **Total project cost:** $67,890

2.0 STATEMENT OF NEED

2.1 The purpose of this assessment is to determine the sources of impairments to the Cottonwood Creek in Mellette County, South Dakota. The Creek is an intermittent stream with loadings of sediment and nutrients.

2.2 Cottonwood Creek was targeted for assessment because it was listed on the 303(d) list of impaired waterbodies for TDS and conductivity.

Cottonwood Creek watershed encompasses approximately 107,478 acres in Mellette County. The stream drains agricultural lands made up predominantly of grazing lands with the balance being crop and hay ground. Small feedlots and winter feeding areas are present in the watershed. Two large hog confinements with waste management systems are located in the watershed. Both confinements have EPA approved permits and are total retention facilities.

Species listed in the federal list of threatened and endangered species are the bald eagle (Haliaeetus leucocephalus), and black-footed ferret (Mustela nigripes). These species will not be impacted by assessment work of this project.

2.3 See Map in Figure 1.

2.4 Landuse in the watershed is primarily agricultural grazing (90%) and cropland (10%). Small grain and hay are the main crops on cultivated lands.

The major soil associations found in the Cottonwood Creek watershed are Haverson-Glenberg, Samsil-Lakoma, Poal-Promise-Samsil, Tuthill-Mnater, Imlay-Conata, Badland, Norrest, Epping-Huggins-Imlay, Huggins-Kadoka, and Ree.

The average annual precipitation in the watershed is 19.12 inches of which 75% usually falls from April through September. Thunderstorms are the main source of precipitation in the growing season and vary greatly in intensity and rainfall amount. These storms are local and of short duration occasionally producing heavy rainfall events. The average seasonal snowfall is 33 inches per year.

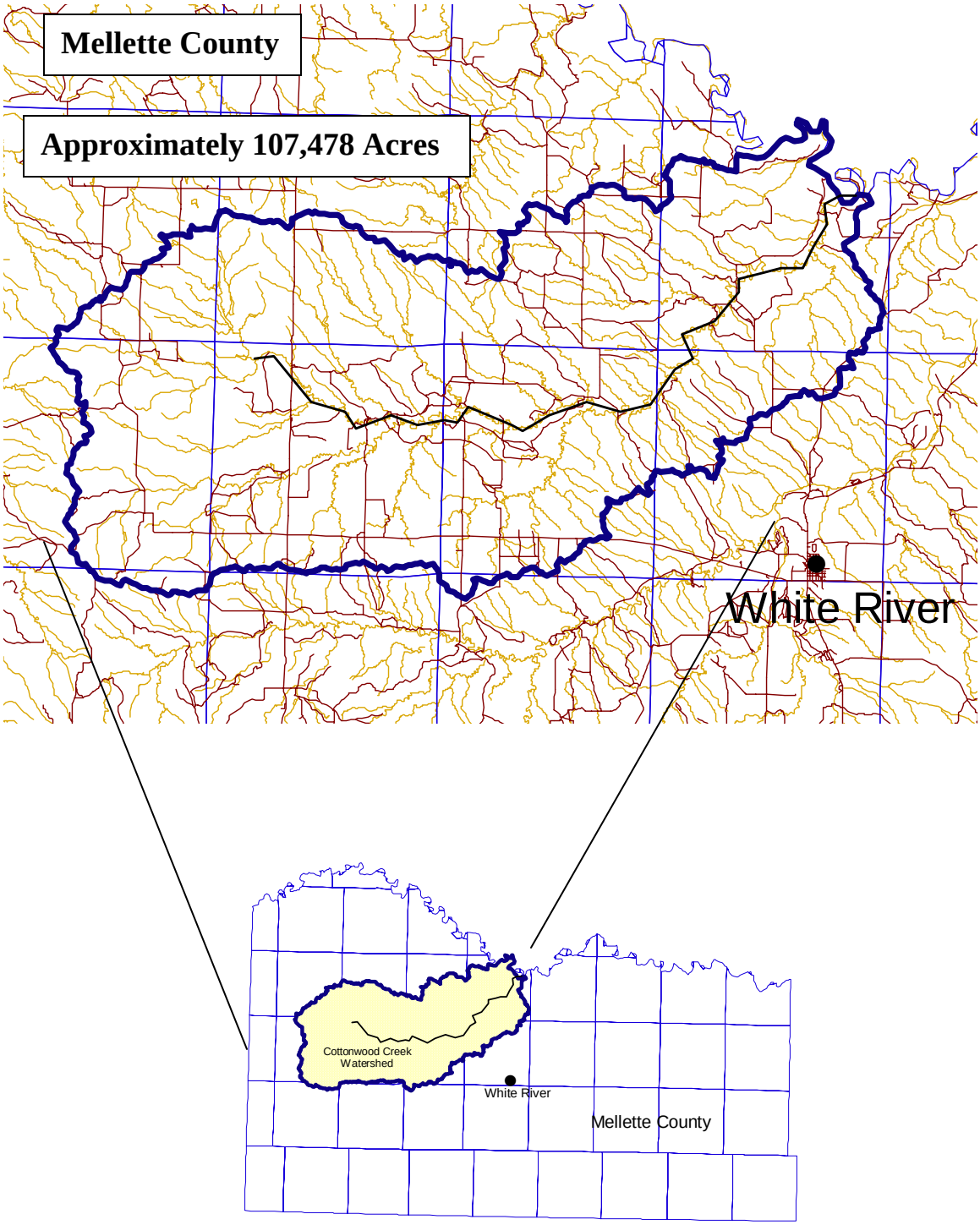


Figure 1. Cottonwood Creek Watershed in Mellette County, South Dakota.

ASSESSMENT WORKPLAN

3.0 The Cottonwood Creek Assessment Project is a comprehensive assessment that will address sediment and nutrient problems in the watershed along with the conductivity problem. The overall goal is to produce a TMDL for conductivity and improve the general water quality of the watershed. This will be accomplished by planning an effective implementation project and/or creating a site-specific standard that realistically reflects the natural conditions found in the watershed. Reducing nonpoint pollutants in the watershed will improve the water quality in the watershed and improve habitat for upland and aquatic species.

3.1 OBJECTIVES AND TASKS

OBJECTIVES 1: Determine annual nutrient and sediment loads to the Cottonwood Creek. The information will be collected at the sites Listed in Table 1 and shown in Figure 2.

Site Name	Description
C WT 1	Section 11 T 42N R 31W
CWT 2	Section 12 T 42N R 30W
CWT 3	Section 29 T 43N R 29W
CWT 4	Section 14 T 43N R 29W

TASK 1 Determine annual nutrient and sediment loads to the Cottonwood Creek.

Install water level recorders on 4 monitoring sites and maintain a continuous stage record for the project period, with the exception of winter months after freeze up.

Discrete discharge measurements will be taken on a regular schedule and during storm events. Discharge measurements will be taken with a hand held current velocity meter.

Discharges should be taken at different stages and frequently enough to develop a stage discharge rating curve. Discharge measurements and water level data will be used to calculate a hydrologic budget for the stream systems. This information will be used with concentrations of sediment and nutrients to calculate loadings from the watershed.

Collect water quality samples at 4 monitoring sites. Samples will be collected during spring runoff, storm events, and monthly base flow (if applicable). Approximately 15 samples will be collected at each site and 5 additional grab samples (Bottle A only) will be taken from smaller tributaries in the watershed. Approximately 8 selenium samples will be taken. An estimated 73 samples will be taken. Proposed water quality monitoring sites may be found in Figure 2.

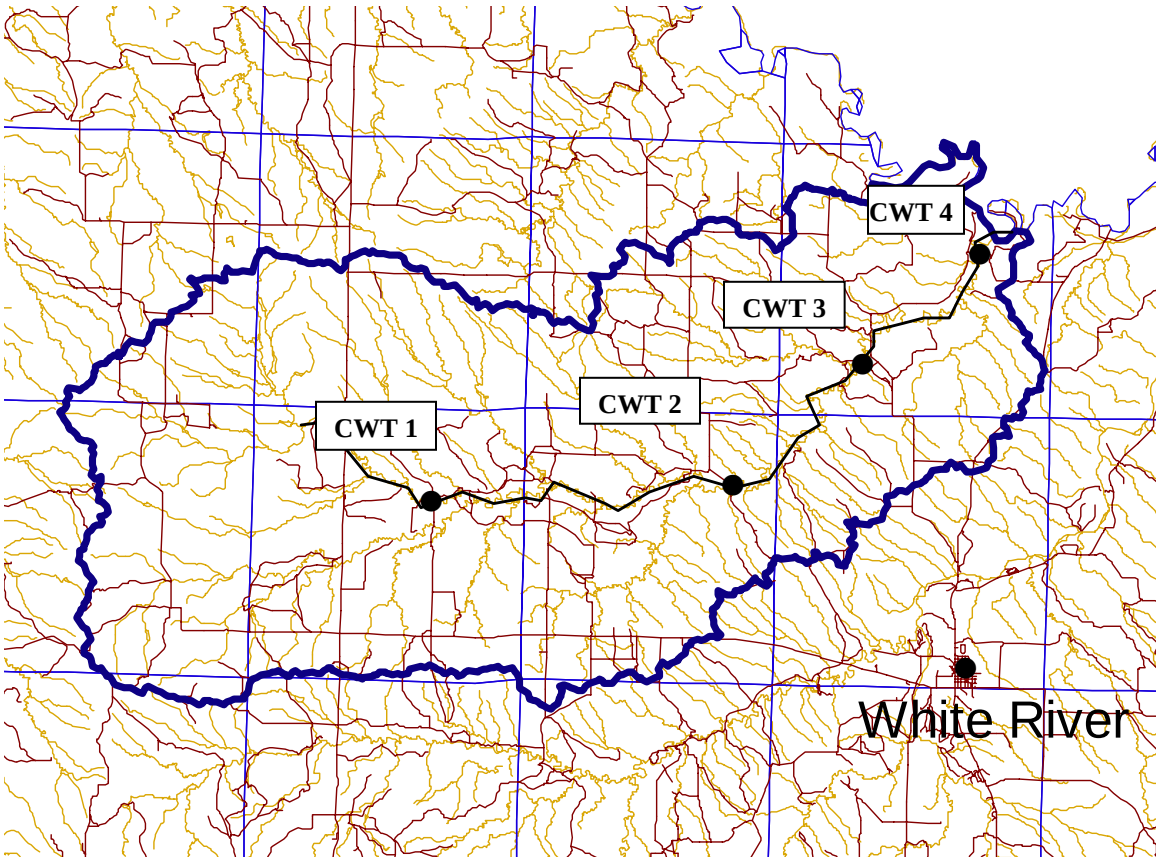


Figure 2. Cottonwood Creek proposed tributary monitoring sites.

PRODUCTS:

- Installation of all necessary gauging equipment (4 monitoring sites)
- Collection of necessary discharge measurements at differing stages (minimum of 8 at each site)
- Collection of water chemical samples (approximately 15 per site depending on discharge)

RESPONSIBLE AGENCIES

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources

WORK ACTIVITIES:
The collection and organization of all discharge water quality data. All samples will be collected according to the program's Standard Operating Procedures for Field Samplers.

OBJECTIVE 2: Evaluation Of Agricultural Impacts To The Water Quality Of The Watershed Through The Use Of The Annualized Agricultural Nonpoint Source (AnnAGNPS) Model.

TASK 2 AnnAGNPS Model Data Collection

Collect and input data into the AnnAGNPS model and field verify for accuracy and model the Cottonwood Creek watershed.

The Cottonwood Creek watershed in Mellette County will be modeled using the AnnAGNPS model. ANNAGNPS is a comprehensive land use model that estimates sediment and nutrient loss and delivery and evaluates the impacts of livestock feeding areas. The watershed will be divided into cells. Each cell will be analyzed after collecting a variety of parameters for each cell with additional information collected for animal feeding operations.

The AnnAGNPS model will be used to identify critical areas of nonpoint source pollution to the surface waters in the watershed. If critical areas are identified, the model will be used to determine attainable targets and goal for the TMDL.

PRODUCTS:
- AnnAGNPS model for Cottonwood Creek watershed in Mellette County.
- Identify critical areas and attainable reduction.

RESPONSIBLE AGENCIES
Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources
Natural Resource Conservation Service

OBJECTIVE 3: Assess affects of prairie dogs on sediment transport

TASK 3: Locating Prairie Dog Sampling Sites

The South Dakota Department of Agriculture provided the funds for prairie dog portion of the study. The local coordinator will work with the conservation district and local producers to find two sampling sites below prairie dog towns in a creek or draw that can accurately portray the sediment loss from the prairie dog town area. The local coordinator will also find two similar watersheds without a prairie dog town. These two sites will be set up in areas not affected by prairie dogs to be comparable to the prairie dog sites. Watershed acres, grazing management, slope and other characteristics affecting runoff should be taken into consideration.

The local coordinator will collect discrete discharge samples and measurements during run-off events (approx. 10 samples at each site). Samples collected by the Great Little Sampler (GLS) and the coordinator will be analyzed for total solids, total suspended solids and total volatile suspended solids. Grab samples taken by the coordinator will also be analyzed for fecal coliform and E. coli (approx. 5 samples at each site). The results of the data will be analyzed and put into a final report.

Total Costs: $12,490 PPG Cost: $0

PRODUCTS:

- Locate four sites as described in the objective.
- Collect an estimated 10 discrete samples at each site.
- Final report on prairie dog study sharing the data collected and conclusion drawn

RESPONSIBLE AGENCIES

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Agriculture
South Dakota Department of Environmental and Natural Resources
Natural Resource Conservation Service

WORK ACTIVITIES:
Collect data to determine the impact of a prairie dog town on the sediment that enters the Cottonwood Creek.

OBJECTIVE 4: Fecal Coliform Source Tracking On The White River

TASK 4: Collect Fecal Coliform Samples on the White River

The collection of 51 fecal coliform grab samples from three monitoring sites on the White River. Two samples from each site will be collected from Oglala, Kadoka and Oacoma, South Dakota; from May through September 2005.

Sample collection procedures will follow Standard Operation Procedures for Field Samplers, Volume I. Samples will be analyzed for fecal coliform and E. coli bacteria colonies at the South Dakota State Health Laboratory, Pierre , South Dakota.

After identifying E. coli bacteria, E. coli colonies will then be further analyzed using pulse-gel electrophoresis to determine the bacterial source. Five isolates will be generated from each sample and gels will be compared to known sources in the South Dakota DNA database to identify potential sources.

PRODUCTS:

- Collect 51 fecal coliform samples from three (3) sites on the White River.
- Estimate possible sources from 51 fecal coliform samples on the White River

RESPONSIBLE AGENCIES

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources
South Dakota State Health Laboratory

OBJECTIVE 5: Quality Assurance/Quality Control (QA/QC)

TASK 5: QA/QC Procedures For Data Collection

The collection of all field water quality data will be accomplished in accordance with the Standard Operation Procedures for Field Samplers, South Dakota Nonpoint Source Program.

The number of QA/QC samples is based on a minimum of 10 percent of all samples collected. If the proposed sampling schedule is met, up to 7 blank and 7 replicate QA/QC samples will be collected for water chemistry samples. A total of six fecal coliform QA/QC samples will be collected from the White River.

All QA/QC activities will be conducted in accordance with Nonpoint Source Program Quality Assurance Project Plan.

The activities involved with QA/QC procedures and the results of QA/QC monitoring will be compiled and reported on in a section of the final report and in all project reports.

All samples will be collected using the methods described in the Standard Operation Procedures for Field Samplers by the State of South Dakota Water Resources Assistance Program. Range conditions will follow NRCS methodologies, stream and habitat assessment will follow EMAP methodologies.

PRODUCTS:

- Seven (or 10 percent of samples taken) QA/QC sample sets for water chemistry (a set includes one blank and one replicate).
- Six QA/QC samples for fecal coliform.

RESPONSIBLE AGENCIES

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources

WORK ACTIVITIES:
Approved QA/QC will be utilized on all sampling and field data collected during the Cottonwood Creek Assessment Project. Please refer to the South Dakota Nonpoint Source Program Quality Assurance Plan and the South Dakota Nonpoint Source Program Standard Operation Procedures for Field Samplers for details of the procedures to be followed.

OBJECTIVE 6: Public Participation

TASK 6: Public Participation and Involvement Will Be Provided For And Encouraged.

Informational meetings will be held on a quarterly basis for the general public and to inform the involved parties of progress on the study. These meetings will provide an avenue for input from the residents in the area. A concluding meeting will be held wile the watershed assessment final draft is finished to get any last public input and comment into the draft report for DENR and EPA review.

News releases will be prepared and released to local news media on a quarterly basis. These releases will be provided to local newspapers, radio stations and TV stations.

PRODUCTS:

- 4 public meetings will be held
- 4 news releases will be produced

RESPONSIBLE AGENCIES

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources

WORK ACTIVITIES:
Informational meetings will be held on a frequent basis for the general public to inform the involved parties of progress on the study and provide a means of public input.

OBJECTIVE 7: Reporting

TASK 7: Sponsor's Reporting Duties

The sponsor will submit no more than monthly requests for payments along with documented work completed since the last voucher.

The sponsor will fulfill EPA grant requirements by submitting semi-annual updates and annual reports for input in the GRTS reporting system.

The sponsor will submit no more than monthly requests for payments along with documented work completed since the last voucher.

Once the field data is collected, an extensive review of the historical and project data will be conducted. The data will be organized and a final report will be submitted to the project officer including all data and a financial report of money expended.

TASK 8: Department's Reporting Duties

The project officer will ensure all semi-annual and annual reports are sent to the GRTS reporting officer. The department (DENR) will be responsible for the final report including hydrologic, sediment and nutrient budgets for the watershed.

The final report will also include the results of the AnnAGNPS modeling of the watershed, which includes cropped, range feedlot and pasture and will be used in conjunction with the water quality and hydrologic budget to determine critical areas in the watersheds.

Feasible management practices will be compiled into a list of recommendations for the development of an implementation project will also be included in the final project report.

TMDL target and goals will be included in the final report of the Cottonwood Creek Watershed Assessment document.

PRODUCTS:

- Semi annual and annual reports as required by the EPA grant
- Final report to the department from the sponsor
- Final report including the TMDL submitted to EPA by the Department of Environment and Natural Resources

RESPONSIBLE AGENCIES

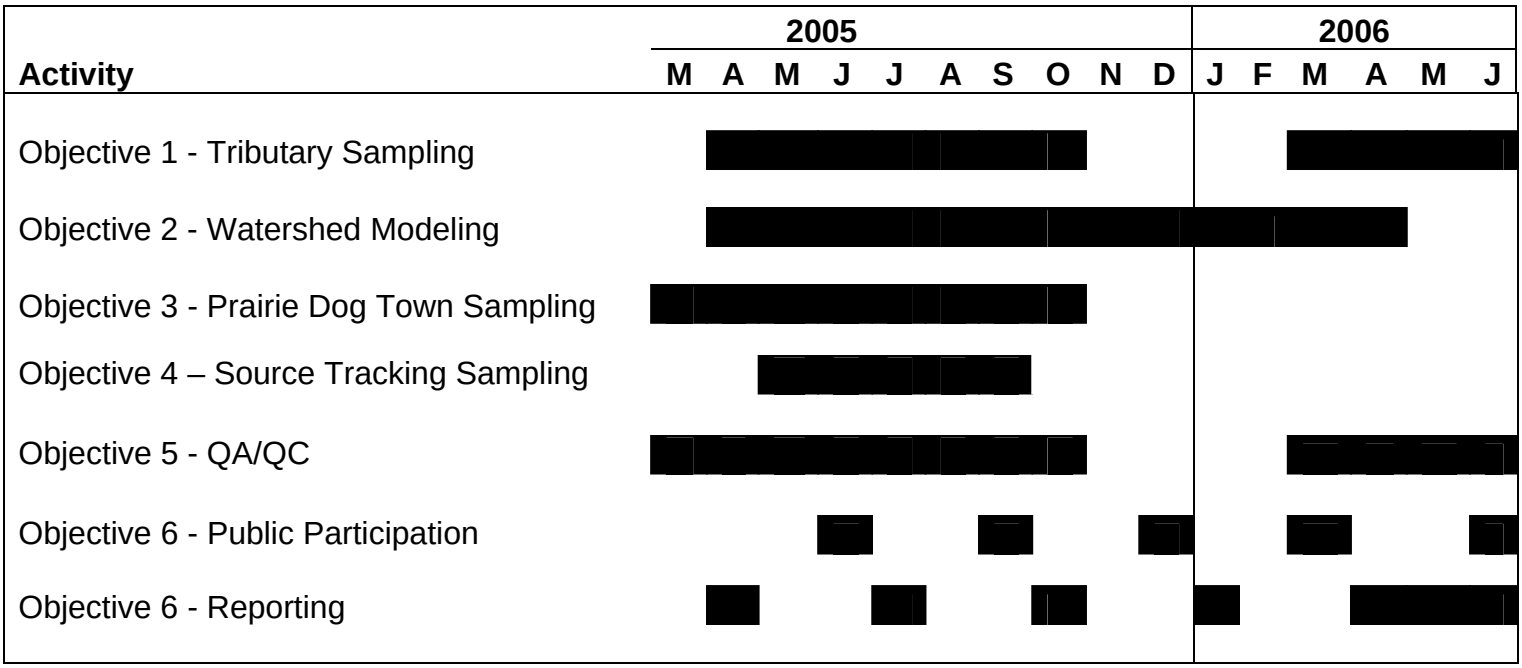
Task Responsibility:
Project Coordinator
Project Sponsor
Project Officer

Design and Technical Assistance:
South Dakota Department of Environmental and Natural Resources

WORK ACTIVITIES:

All required GRTS reporting will be written according to EPA guidelines. An extensive review of current and historical data and will be done to determine the best management practices and hydrologic restoration techniques needed to improve water quality and reduce sediment transport in the Cottonwood Creek watershed.

3.2 MILESTONE TABLE



3.3 No special permits are required to do this assessment project.

3.4 The Mellette County Conservation District is the lead project sponsor for this project. The conservation district is important to this project because of its relationship with landowners in the watersheds. The main problem with this watershed appears to be conductivity and TDS.

4.0 COORDINATION PLAN

4.1 The following groups/agencies have agreed through an informal agreement to cooperate in the Cottonwood Creek Assessment Project.

Mellette County Conservation District-Local project sponsor

South Central RC&D-Local support

USDA Natural Resource Conservation Service-Support and technical assistance

US Environmental Protection Agency-Financial support and technical assistance

South Dakota Department of Agriculture-Financial support and technical assistance

South Dakota Department of Environment and Natural Resources-Financial support and technical assistance

4.2 In 2002 Cottonwood Creek was listed on the 303(d) list for impaired waters for conductivity and total dissolved solids. The local conservation district has served as lead sponsor on previous assessments and is interested in continuing assessing the impaired waters in their county.

4.3 Local organizations expressed support for the Cottonwood Creek Assessment Project

4.4 This project will coordinate with frequent informal conservations with state, federal, and local government agencies and through quarterly meetings with the conservation district.

4.5 There are currently no other agencies conducting assessment project activities on Cottonwood Creek.

5.0 EVALUATION AND MONITORING PLAN

5.1 The monitoring strategy is explained in section 3. The project will produce biannual progress reports. The sampling and analysis procedures required to complete the tasks within section 3 can be located in the Standard Operating Procedures for Field Samplers for the South Dakota Nonpoint Source Program (SOP). The specific locations of these sampling methods within the SOP as they pertain to each task are documented in Table 3 on the following page.

5.2 This assessment project consists of a combination of chemical, hydrologic, and land use analyses. Monitoring sites will be maintained and sampled on Cottonwood Creek. Ambient samples will be collected along with spring runoff and storm events. Stream discharge will be routinely measured. The chemical and physical parameters to be sampled during this project can be located in Table 2. Loads will be calculated based on the samples and data collected with approved methods identified in Section 5.1. Land use modeling (AnnAGNPS) will be used to assess land use practices, identify priority areas and model reductions. A TMDL report will be produced for Cottonwood Creek in Mellette County.

5.3 All water quality monitoring will be done in accordance with the approved South Dakota Nonpoint Source Program Quality Assurance/Quality Control Project Plan and Standard Operation Procedures for Field Samplers for the South Dakota Nonpoint Source Program. Range conditions will follow NRCS methodologies stream and habitat assessment will follow EMAP methodologies.

5.4 Results from all water quality monitoring effort under the Cottonwood Creek Assessment Project will be reported in the final project report. Data will be managed by the South Dakota Department of Environment and Natural Resources and Maintained in a computer database. All sample data will be used as the foundation of Section 319 Watershed Implementation Project proposal.

6.0 BUDGET

See attached budget page

7.0 PUBLIC INVOLVEMENT

See Objective 5

TASK NUMBER	TASK DESCRIPTION	ACTIVITY	REFERENCE IN SDWRA-2005 SOP
Task 1	Determine nutrient and sediment loads to Cottonwood Creek	Discharge measurements Sample collection	Vol. I Section 12.0 pp 1-6 Vol. I Section 12.0 pp 7-19
Task 2	Use of ANNAGNPS	Run ANNAGNPS model	Vol. I Section 13.0
Task 3	Prairie dog water chemistry samples	Tributary sampling procedures	Vol. I Section 12.0
Task 4	Collect fecal coliform samples	Tributary sampling Procedures	Vol. I Section 12.0 pg 8
Task 5	Quality Assurance/Quality Control	Quality Assurance Quality Control Sampling	Vol. I Section 8.0 pp. 1-8

6.0 Budget

Item			Year 1 2005 (April-December)	Year 2 2006 (January-September)	Total	PPG Carry Over	DENR Fee Fund
Salaries			$10,240.00	$10,240.00	$20,480.00	$10,480.00	$10,000.00
Local Administration			$1,000.00	$1,000.00	$2,000.00		
Travel			$2,240.00	$2,240.00	$4,480.00	$4,000.00	$480.00
Equipment			$1,370.00	$1,370.00	$2,740.00	$2,740.00	
Supplies and Shipping			$630.00	$630.00	$1,260.00	$1,260.00	
Objective 1	**Determine annual nutrient and sediment loads to the Cottonwood Creek**						
	Salaries	**Included in general salaries**					
	Water Quality Analysis		$5,500.00	$5,500.00	$11,000.00	$11,000.00	
	Travel	**Included in general travel budget**					
	Equipment	**Included in general equipment budget**					
	Supplies and Shipping	**Included in general supplies and shipping budget**					
Objective 2	**AnnAGNPS Model Data Collection**						
	Salaries	**Included in general salaries**					
	Travel	**Included in general travel budget**					
	Supplies and Shipping	**Included in general supplies and shipping budget**					
Objective 3	**Assess affects of prairie dogs on sediment transport**						
	Salaries		$3,300.00	$3,300.00	$6,600.00		
	Local Administration		$400.00	$400.00	$800.00		
	Water Quality Analysis		$1,570.00	$1,570.00	$3,140.00		
	Travel		$650.00	$650.00	$1,300.00		
	Supplies and Shipping		$325.00	$325.00	$650.00		
Objective 4	**Fecal Coliform Source Tracking On The White River**						
	Salaries		$1,260.00	$1,260.00	$2,520.00	$1,520.00	$1,000.00
	Source Tracking Analysis		$3,300.00	$3,300.00	$6,600.00	$4,000.00	$2,600.00
	Travel		$500.00	$500.00	$1,000.00	$1,000.00	
Objective 5	**Quality Assurance/Quality Control (QA/QC)**						
	Salaries	**Included in general salaries**					
	QA/QC Lab Analysis		$1,660.00	$1,660.00	$3,320.00	$3,000.00	$320.00
	Travel	**Included in general travel budget**					
	Equipment	**Included in general equipment budget**					
	Supplies and Shipping	**Included in general supplies and shipping budget**					
Objective 6	**Public Participation**						
	Salaries	**Included in general salaries**					
	Travel	**Included in general travel budget**					
	Supplies and Shipping	**Included in general supplies and shipping budget**					
Objective 7	**Reporting**						
	Salaries	**Included in general salaries**					
	Travel	**Included in general travel budget**					
	Supplies and Shipping	**Included in general supplies and shipping budget**					
Total Project			$33,945.00	$33,945.00	$67,890.00	$39,000.00	$14,400.00

SOUTH DAKOTA NONPOINT SOURCE PROGRAM
QUALITY ASSURANCE PROJECT PLAN

SUBMITTED BY:

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF FINANCIAL AND TECHNICAL ASSISTANCE
WATER RESOURCES ASSISTANCE PROGRAM

Prepared by: Robert Smith
February 2001

Project Title: Cottonwood Creek Watershed Assessment Project

APPROVED BY:

South Dakota Watershed Protection Program Environmental Senior Scientist, Assessment Section	Date
South Dakota Watershed Protection Program Project Officer	Date
South Dakota Watershed Protection Program Quality Assurance Coordinator	Date
South Dakota DENR Quality Assurance Officer	Date